CLAIMS

1. A secondary cell electrode comprising an electrode active material layer having a density gradient.

2. The secondary cell electrode as claimed in claim 1, comprising a nonaqueous electrolyte cell-oriented electrode in which the electrode active material layer is formed on a collector, having the density gradient developed with a gradient of a solid concentration increasing along a thickness from a surface of the electrode active material layer toward the collector.

3. The secondary cell electrode as claimed in claim 2, wherein the electrode active material layer comprises a plurality of laminated thin film layers different in the solid concentration.

4. The secondary cell electrode as claimed in 2, wherein the solid concentration is a concentration of an electrode active material.

5. The secondary cell electrode as claimed in claim 2, wherein the solid concentration includes concentrations of an electrode active material, an electrically conductive material, and a binder.

6. The secondary cell electrode as claimed in claim 2, wherein the electrode active material layer has a thickness within a range of 1-100μm.

7. The secondary cell electrode as claimed in claim 1, comprising a gel electrolyte cell-oriented electrode in which the electrode active material layer is formed on a collector, having the density gradient developed with a gradient of a concentration of an electrolyte salt along a thickness from a surface of the electrode active material layer toward the collector.

8. The secondary cell electrode as claimed in claim 7, wherein the electrode active material layer comprises a plurality of laminated thin film layers different in concentration of the electrolyte salt.

9. The secondary cell electrode as claimed in claim 1, comprising a gel electrolyte cell-oriented electrode in which the electrode active material layer is formed on a collector, having the density gradient developed with a gradient of a concentration of a film forming material along a thickness from a surface of the

electrode active material layer toward the collector.

10. The secondary cell electrode as claimed in claim 9, wherein the electrode active material layer comprises a plurality of laminated thin film layers different in concentration of the film forming material.

11. The secondary cell electrode as claimed in claim 1, comprising a gel electrolyte cell-oriented electrode in which the electrode active material layer is formed on a collector, having the density gradient developed with gradients of concentrations of an electrolyte salt and a film forming material along a thickness from a surface of the electrode active material layer toward the collector.

12. The secondary cell electrode as claimed in claim 11, wherein the electrode active material layer comprises a plurality of laminated thin film layers different in concentrations of the electrolyte salt and the film forming material.

13. The secondary cell electrode as claimed in claim 1, wherein the electrode active material layer has a thickness within a range of 1-100μm.

14. A fabrication method comprising fabricating a secondary cell electrode comprising an electrode active material layer having a density gradient.

15. The fabrication method as claimed in claim 14, wherein the secondary cell electrode comprises a nonaqueous electrolyte cell-oriented electrode, comprising:

(a) changing a quantity of a solid to be added to compose the electrode active material layer, thereby preparing a plurality of kinds of electrode slurry different in concentration of the solid; and

(b) coating a collector with the plurality of kinds of electrode slurry so that the density gradient is developed with a gradient of an concentration of the solid sequentially increased from a surface of the electrode active material layer toward the collector, thereby laminating a plurality of thin film layers different in concentration of the solid.

16. The fabrication method as claimed in claim 15, wherein the thin film layer is coated by a thickness within a range of 1-100μm in the step (b).

17. The fabrication method as claimed in claim 15, wherein the electrode

slurry is coated onto the collector by an ink jet method in the step (b).

18. The fabrication method as claimed in claim 17, wherein the ink jet method employs a piezo system.

19. The fabrication method as claimed in claim 14, wherein the secondary cell electrode comprises a gel electrolyte cell-oriented electrode, comprising:

(a) changing a quantity of an electrolyte salt to be added to compose the electrode active material layer, thereby preparing a plurality of kinds of electrode slurry different in concentration of the electrolyte salt; and

(b) coating a collector with the plurality of kinds of electrode slurry so that the density gradient is developed with a gradient of a concentration of the electrolyte salt from a surface of the electrode active material layer toward the collector, thereby laminating a plurality of thin film layers different in concentration of the electrolyte salt.

20. The fabrication method as claimed in claim 14, wherein the secondary cell electrode comprises a gel electrolyte cell-oriented electrode, comprising:

(a) changing a quantity of a film forming raw material to be added to compose the electrode active material layer, thereby preparing a plurality of kinds of electrode slurry different in concentration of the film forming raw material; and

(b) coating a collector with the plurality of kinds of electrode slurry so that the density gradient is developed with a gradient of a concentration of the film forming raw material from a surface of the electrode active material layer toward the collector, thereby laminating a plurality of thin film layers different in concentration of the film forming raw material.

21. The fabrication method as claimed in claim 14, wherein the secondary cell electrode comprises a gel electrolyte cell-oriented electrode, comprising:

(a) changing quantities of an electrolyte salt and a film forming raw material to be added to compose the electrode active material layer, thereby preparing a plurality of kinds of electrode slurry different in concentrations of the electrolyte salt and the film forming raw material; and

(b) coating a collector with the plurality of kinds of electrode slurry so that

the density gradient is developed with gradients of concentrations of the electrolyte salt and the film forming raw material from a surface of the electrode active material layer toward the collector, thereby laminating a plurality of thin film layers different in concentrations of the electrolyte salt and film forming raw material.

22. The fabrication method as claimed in claim 19, wherein the thin film layer is coated by a thickness within a range of 1-100μm in the step (b).

23. The fabrication method as claimed in claim 20, wherein the thin film layer is coated by a thickness within a range of 1-100μm in the step (b).

24. The fabrication method as claimed in claim 21, wherein the thin film layer is coated by a thickness within a range of 1-100μm in the step (b).

25. The fabrication method as claimed in claim 19, wherein the electrode slurry is coated onto the collector by an ink jet method in the step (b).

26. The fabrication method as claimed in claim 20, wherein the electrode slurry is coated onto the collector by an ink jet method in the step (b).

27. The fabrication method as claimed in claim 21, wherein the electrode slurry is coated onto the collector by an ink jet method in the step (b).

28. The fabrication method as claimed in claim 25, wherein the ink jet method employs a piezo system.

29. The fabrication method as claimed in claim 26, wherein the ink jet method employs a piezo system.

30. The fabrication method as claimed in claim 27, wherein the ink jet method employs a piezo system.

31. A secondary cell comprising the secondary cell electrode of claim 1.

32. The secondary cell as claimed in claim 31, wherein the secondary cell is a lithium ion secondary cell.

33. The secondary cell as claimed in claim 31, wherein the secondary cell is a bipolar cell.

34. The secondary cell as claimed in claim 31, comprising:

a positive electrode comprising a first collector, and a positive-electrode oriented active material layer having a gradient of an electrolyte salt concentration

increased along a thickness from a surface of the positive-electrode oriented active material layer toward the first collector;

a negative electrode comprising a second collector, and a negative-electrode oriented active material layer having a gradient of an electrolyte salt concentration decreased along a thickness from a surface of the negative-electrode oriented active material layer toward the second collector; and

an electrolyte layer.

35. The secondary cell as claimed in claim 31, comprising:

a positive electrode comprising a first collector, and a positive-electrode oriented active material layer having a gradient of an electrolyte salt concentration decreased along a thickness from a surface of the positive-electrode oriented active material layer toward the first collector;

a negative electrode comprising a second collector, and a negative-electrode oriented active material layer having a gradient of an electrolyte salt concentration increased along a thickness from a surface of the negative-electrode oriented active material layer toward the second collector; and

an electrolyte layer.

36. The secondary cell as claimed in claim 34, wherein the negative-electrode oriented active material layer has a gradient of a film forming material concentration increased along the thickness from the surface of the negative-electrode oriented active material layer toward the second collector.

37. The secondary cell as claimed in claim 35, wherein the negative-electrode oriented active material layer has a gradient of a film forming material concentration increased along the thickness from the surface of the negative-electrode oriented active material layer toward the second collector.

38. The secondary cell as claimed in claim 31, wherein the electrode active material layer comprises a negative-electrode oriented active material layer having a gradient of a film forming material concentration increased along a thickness from a surface of the negative-electrode oriented active material layer surface toward a collector.

39. The secondary cell as claimed in claim 31, wherein the density gradient is developed with a concentration gradient of an ingredient of an active material layer of the secondary cell electrode.

40. A complex cell comprising a plurality of secondary cells according to claim 1, connected d to each other.

41. A complex cell comprising a plurality of secondary cells fabricated by the fabrication method of claim 14, connected to each other.

42. A vehicle including a secondary cell according to claim 1.

43. A vehicle including a secondary cell fabricated by the fabrication method of claim 14.